onyx
TECHNICAL
GUIDE

This manual offers all the required information about the usage of the photovoltaic architectonic glazing manufactured by Onyx Solar. Instructions must be totally read through and the steps herein exposed must be followed. The company shall not be liable for any damages, losses or expenses derived from the failure to comply with the conditions specified in this document.

El siguiente manual ofrece toda la información necesaria sobre el uso del vidrio arquitectónico fotovoltaico fabricado por Onyx Solar. Por favor, lea la guía en su totalidad, y siga los pasos aquí expuestos. La empresa no se hace responsable de los daños, pérdidas o gastos derivados del incumplimiento de las condiciones establecidas en este documento.

Ce manuel offre toutes les informations nécessaires sur l´utilisation du verre architectonique photovoltaïque fabriqué par Onyx Solar. Veuillez lire le guide dans sa totalité et suivre les démarches ici expliquées. L´entreprise ne pourra être tenue pour responsable des dommages, pertes ou dépenses liés au non respect des conditions établies dans ce document.

Questo manuale offre tutta l'informazione necessaria relativa al uso del vetro architettonico fotovolatico prodotto dalla Onyx Solar, legga questa guida nel dettaglio seguendo i passaggi esposti. L'azienda non sara responsabile di danni, smarrimenti o costi derivanti dall'incomplimento delle condizioni stabilite da questo documento.

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1. COMPANY INTRODUCTION

ONYX SOLAR: QUIENES SOMOS

ONYX SOLAR: QUI NOUS SOMMES

ONYX SOLAR: CHI SIAMO

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ONYX SOLAR is a **leading design manufacturer company** which offers **architectonic photovoltaic glazings** that gathers both the electrical characteristics of the solar photovoltaic technology and the functional ones of a given, traditional glazing or architectonic element; these will allow the integration of photovoltaic glazings within any building enclosure.

In this sense, Onyx offers a huge range of photovoltaic glazing that fulfills the highest quality standards of the Building Integrated Photovoltaic Industry (BIPV). At Onyx, we work from the design stage of the photovoltaic glazing to the installation process, testing and commissioning, achieving the optimal balance between aesthetics, energy production and the economics of the product. Glass-glass modules represent a multifunctional bioclimatic solution which combines both active and passive properties, such as UV and IR filter, acoustic and thermal insulation and solar protection: incoming light modulation and building's energy efficiency.

Additionally, **Onyx Solar is an architectural and engineering firm** which offers a full range of consulting services and expertise to design and install unique photovoltaic constructive solutions.

ONYX SOLAR es la **empresa líder en diseño y fabricación de vidrio arquitectónico fotovoltaico** que aunando las características eléctricas de la tecnología solar fotovoltaica y las características funcionales del vidrio o material arquitectónico tradicional, los cuales permitirán la integración de los vidrios fotovoltaicos en cualquier parte de la envolvente del edificio.

En este sentido, Onyx ofrece una amplia gama de módulos de vidrio fotovoltaicos que cumplen con los más altos estándares de calidad de la Integración Fotovoltaica en Edificios (BIPV). En Onyx, trabajamos desde la etapa de diseño del vidrio fotovoltaico hasta el proceso de instalación, comprobación y puesta en marcha del sistema, buscando el equilibrio óptimo entre estética, producción de energía y eficiencia del producto.

Los módulos de vidrio fotovoltaico representan una solución bioclimática multifuncional que combina propiedades activas y pasivas, como el filtro de rayos infrarrojos y ultravioletas, aislamiento acústico y térmico y protección solar: regulación de la luz entrante y eficiencia energética del edificio.

Adicionalmente, **Onyx Solar es una empresa de arquitectura e ingeniería** que ofrece una gama completa de servicios de consultoría, que unido a nuestra experiencia, nos permiten diseñar e instalar soluciones constructivas fotovoltaicas únicas.

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ONYX SOLAR est l´**entreprise leader dans le design et la fabrication du verre architectonique photovoltaïque** qui rassemble les caractéristiques électriques techniques du solaire photovoltaïque, les caractéristiques fonctionnelles du verre ou du matériel architectonique traditionnel, lesquelles permettent l´intégration des verres photovoltaïques sur toutes les faces de l´enveloppe du bâtiment. Dans ce sens, Onyx offre une large gamme de modules de verres photovoltaïques qui remplissent les conditions standards les plus hautes de l´intégration photovoltaïque dans les bâtiments (BIPV). Chez Onyx, nous travaillons depuis l´étape du design du verre photovoltaïque jusqu´au processus d´installation, vérification et mise en œuvre du système, dans le but de chercher l´équilibre optimum entre l´esthétique, la production d´énergie et l´efficacité du produit. Les modules photovoltaïque bi-verre représentent une solution bioclimatique multifonctionnelle qui combine les propriétés actives et passives, comme le filtre de rayons infrarouges et ultraviolets, isolement acoustique, thermique et de protection solaire : comme par exemple la régulation de la lumière entrante et l´efficacité énergétique du bâtiment.
Dans le même temps, **Onyx est une entreprise d´architecture et d´ingénierie** expérimentée qui offre une gamme complète de services de consulting permettant de concevoir et installer des solutions constructives photovoltaïques uniques.

ONYX SOLAR è un'**azienda leader nel disegno e la fabbricazione di vetro fotovoltaico per l'Architettura** che con la unione delle caratteristiche elettriche della tecnologia fotovoltaica e le caratteristiche funzionali del vetro o materiale architettonico tradizionale, permettono l'integrazione del vetro fotovoltaico alla totalita dell'avvolgente dell'edificio.
In relazione allo succitato, Onyx offre un'ampia gamma di moduli di vetro fotovoltaico di alta qualita per l'integrazione fotovoltaica all' edificio (BIPV). Noi della Onyx partiamo dalla fase di definizione di disegno del vetro fotovoltaico fino all' installazione, con i relativi test di messa in funzione del sistema, equilibrando l'estetica, con la produzione di energia ed efficienza di prodotto. I moduloi di vetro fototovoltaico rappresentano una soluzione bioclimatica multifunzionale combinando propieta attive e passive come le funzioni di filtro per infrarosso e ultravioletto, isolamento termico, acustico e protezione solare, regolando la luce entrante e l'efficienza energetica dell'edificio.

Parallelamente **Onyx offre un completo servizio di consulenza per l'architettura e l'ingegneria**, che insieme alla grande esperienza permettono il disegno e l'installazione di soluuzioni architettoiniche uniche.

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2. PRODUCT INTRODUCTION

INTRODUCCIÓN AL PRODUCTO

INTRODUCTION AU PRODUIT

INTRODUZIONE AL PRODOTTO

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ONYX SOLAR manufactures both aesthetic **crystalline and amorphous silicon glass/glass BIPV modules.** Technical data sheets and structural lay-out of Onyx's standard products are shown in the following pages, offering comprehensive information to ease the fundamental objective of **the photovoltaic glazing's integration in the building envelope**.

ONYX SOLAR fabrica **vidrios de integración de tecnología de silicio cristalino y silicio amorfo**. En las siguientes páginas encontraras las fichas técnicas y el diseño estructural de los productos estándar de Onyx, ofreciendo una información comprensiva que facilite el objetivo fundamental de la **integración fotovoltaica en la envolvente del edificio**.

ONYX SOLAR fabrique des **verres en y intégrant la technologie du silicium cristallin et silicium amorphe**. Dans les pages suivantes vous trouverez les fiches techniques et le design structurel des produits standards d´Onyx, offrant une information compréhensive qui facilitera l´objectif fondamental de **l´intégration photovoltaïque dans l´enveloppe du bâtiment.**

ONYX SOLAR fabbrica vetro per integrazione con **tecnologia di silicio amorfo e cristallino**. Le pagine a seguito presenteranno le schede tecniche ed il disegno strutturale dei nostri prodotti standar con un linguaggio acessibile, al fine di facilitare l'obiettivo fondamentale, l'**integtazione fotovoltaica al rivesimento dell'edificio**.

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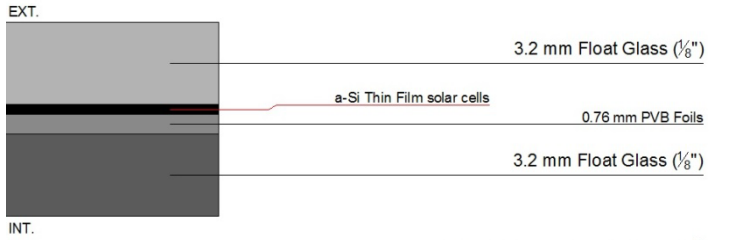
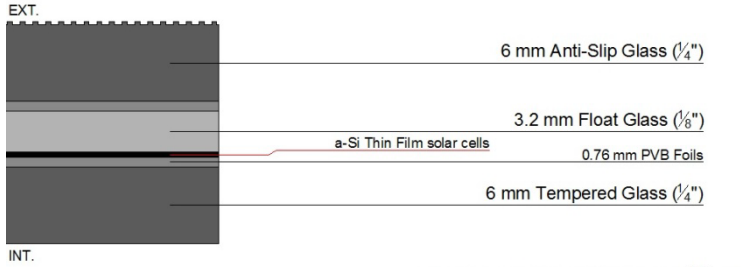
1 4 0 4 3 0

Standard configuration & thickness:

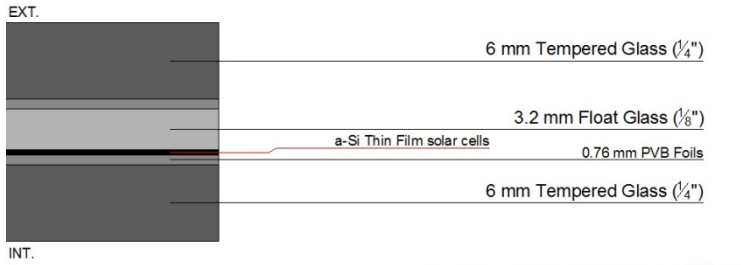
Configuración y espesor estándar / Configuration et épaisseur standard / Stratificazioni standard e spessori



Total thickness: 7.16 mm (9⁄32")



Total thickness: 16.72 mm (11⁄16")



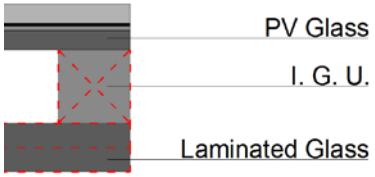
Total thickness: 16.72 mm (11⁄16")

Non-standard thickness?

¿Espesor no estándar? / Epaisseur non standard? / Spessori fuori standard?

We can offer you a wide range of customized thicknesses, including insulating glass units.
Podemos ofrecerle una amplia gama de espesores customizados, incluyendo unidades de vidrio aislante.
Nous pouvons vous offrir une large gamme d´épaisseurs customisés, incluant des unités de verre isolant.
Possiamo offrire un'ampia gamma di spessori customizzati, vetro isolante incluso.

Please, contact us for more information.
Para más información, contacte con nosotros.
Pour de plus amples informations, veuillez nous contacter.
Per ulteriori inforamzioni contattare con noi.



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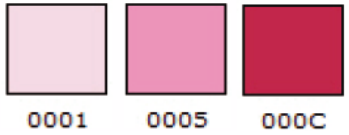
Color category:

Familias de colores / Catégories de couleurs / Famiglie di colori

REDS

ROJOS / ROUGE / ROSSO

A



B

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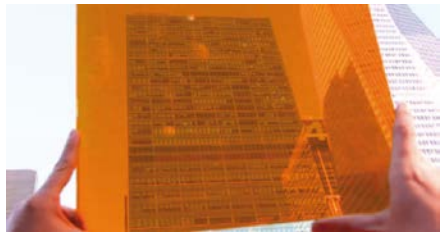
ORANGES



NARANJAS / ORANGE / ARANCIO

A

000E

B

001E 002E 003E 0045 004C 004E 0058 005E 007E 008C 008E

00CE 00EE 00EH

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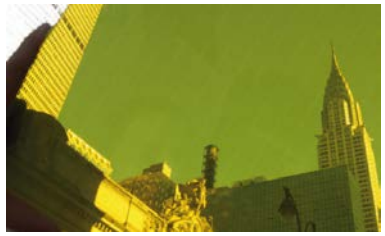
YELLOWS

AMARILLOS / JAUNE / GIALLO



A

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GREENS

VERDES / VERT / VERDE

B

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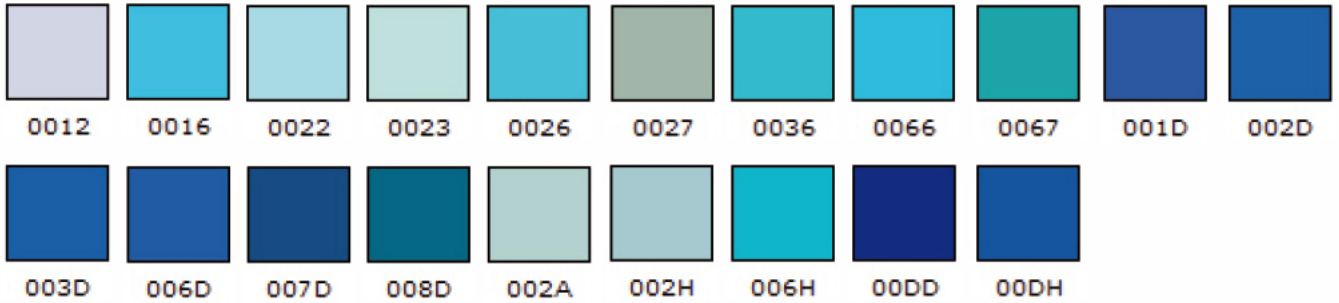
BLUES

AZULES / BLEU / BLU

A

B



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PURPLES

VIOLETAS / VIOLET / VIOLA

B

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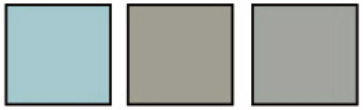
GREYS

GRISES / GRIS / GRIGIO

A

0003 0007 000H

B



003H 007H 009H

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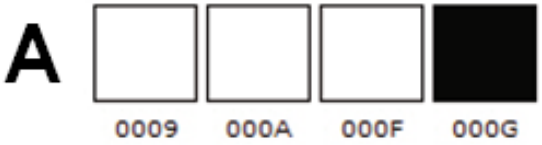
OPAQUES

OPACOS / OPAQUE / OPACO



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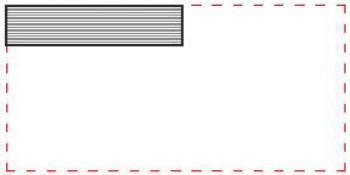
Standard sizes:

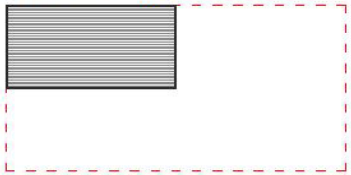
Medidas Estándar / Tailles Standards / Misure standard

SKIN PV GLASS

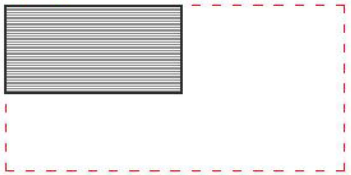
1245 x 300 mm
49" x 11 13/16"



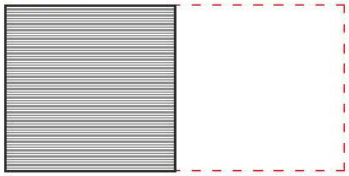
1200 x 600 mm
47 1/4" x 23 5/8"



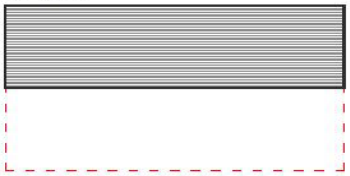
1245 x 635 mm
49" x 25"



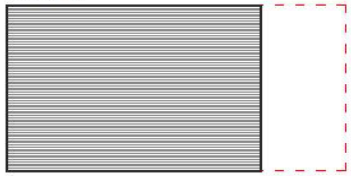
1242 x 1245 mm
49" x 49"



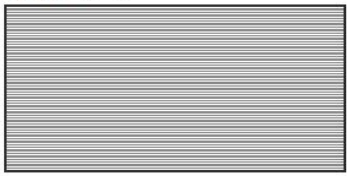
2462 x 635 mm
97" x 25"



1849 x 1245 mm
73" x 49"



2456 x 1245 mm
96 3/4" x 49"



Non-standard size ?

¿Medidas no estándar? / Taille non standard / Misuri fuori standard ?

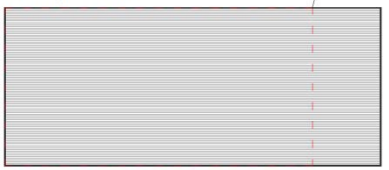
We can offer you a wide range of customized sizes up to 3000 x 1245 mm.

En Onyx Solar ofrecemos una amplia gama de tamaños customizados de hasta 3000x1245 mm.
Nous pouvons vous offrir une large gamme de tailles customisés au-dessus de 3000 x 1245 mm.
Onyx Solar offre un' ampia gamma di spessori customizzati con un masssimo di 3000x1245 mm.

Please, contact us for more information.

Para más información, contacte con nosotros.
Pour de plus amples informations, veuillez nous contacter.
Per ulteriori inforamzioni contattare con noi.

3000 x 1245 mm
118 5/64" x 49"



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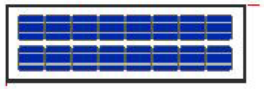
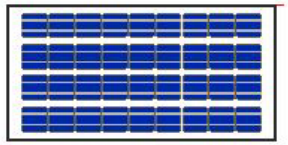
CRYSTALLINE PV GLASS

1641 x 989 mm
64 5/8" x 39"

1475 x 480 mm
58" x 18 7/8"

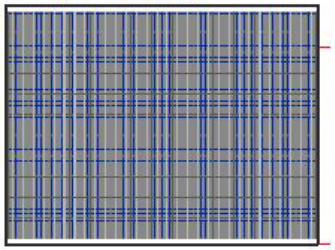


1650 x 850 mm
65" x 33 1/2"



CRYSTALLINE PV GLASS
Transparent Cells

1931 x 1511 mm
76 1/16" x 59 1/2"



FLOOR PV GLASS

600 x 600 mm
23 5/8" x 23 5/8"

Non-standard size ?

¿Medidas no estándar? / Taille non standard / Misuri fuori standard ?

We can offer you a wide range of customized sizes up to 2100 x 3100 mm.
En Onyx Solar ofrecemos una amplia gama de tamaños customizados de hasta 2100 x 3100 mm.
Nous pouvons vous offrir une large gamme de tailles customisés au-dessus de 2100 x 3100 mm.
Onyx Solar offre un' ampia gamma di spessori customizzati con un masssimo di 2100 x 3100 mm.

Please, contact us for more information.
Para más información, contacte con nosotros.
Pour de plus amples informations, veuillez nous contacter.
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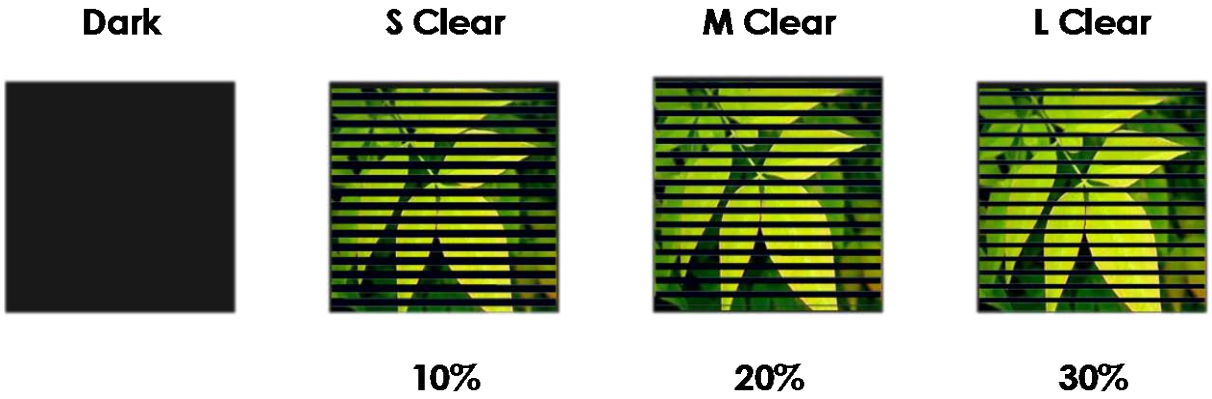
See-through degree:

Grados de semitransparencia / Degré de transparence / Semitrasparenze



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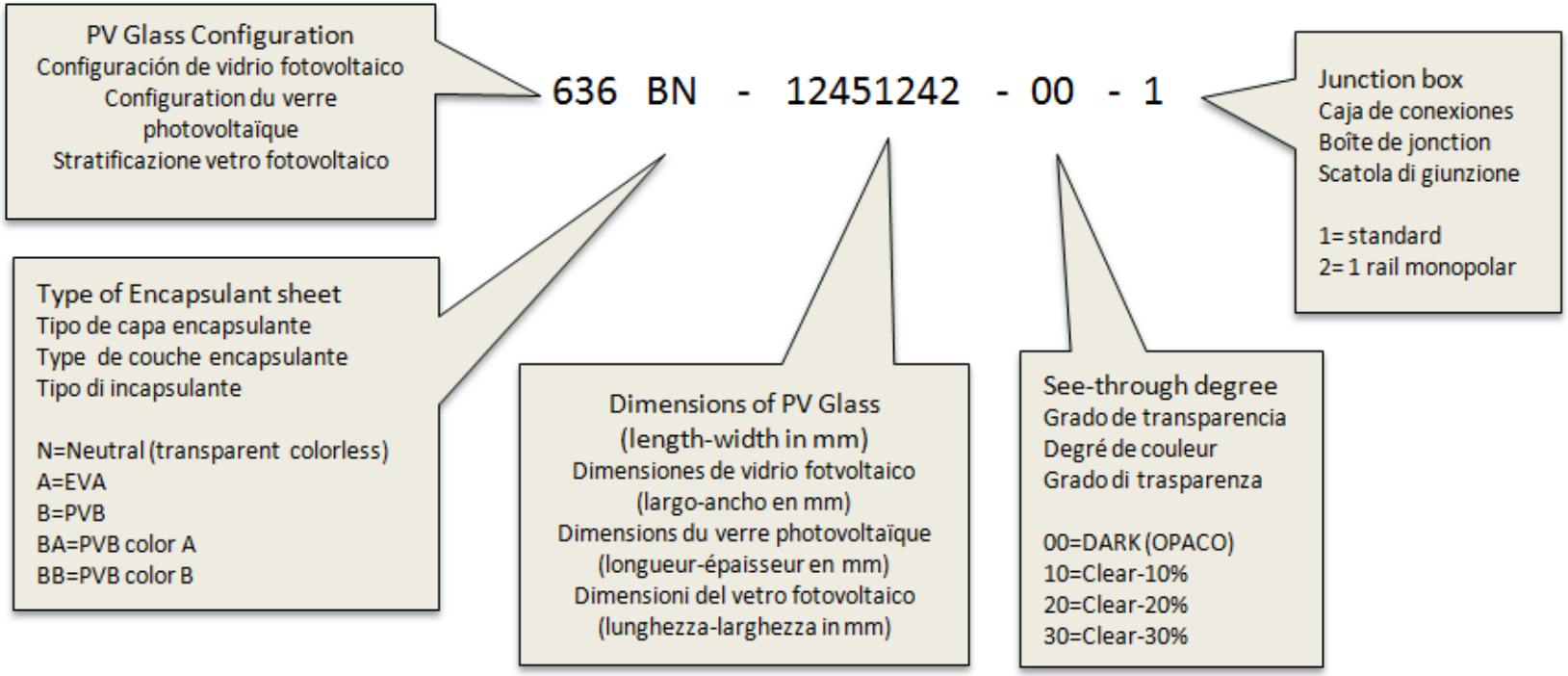
Please follow this sketch in order to define your glass:

Por favor, sigue el siguiente esquema para definir tu tipo de vidrio:
Veuillez suivre le schéma suivant pour définir votre type de verre:
Seguire lo schema per definire il tipo di vetro necessario:



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3. TECHNICAL DATA SHEETS: AMORPHOUS SILICON PV GLASS

FICHAS TÉCNICAS: VIDRIO FV SILICIO AMORFO

FICHES TECHNIQUES: VERRE PV EN SILICIUM AMORPHE

SCHEDE TECNICHE: VETRO VF SILICIO AMORFO

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PHOTOVOLTAIC GLASS				033_N-12450300-_ _-_	
1245 x 300 mm		ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp}(Wp)	22,96	17,69	14,80	13,10
Open-circuit voltage	V_{oc}(V)	22,68	22,68	22,68	22,68
Short-circuit current	I_{sc}(A)	1,50	1,15	0,98	0,83
Voltage at nominal power	V_{mpp}(V)	17,01	17,01	17,01	17,01
Current at nominal power	I_{mpp}(A)	1,35	1,04	0,87	0,77
Power tolerance not to exceed	%	±5	±5	±5	±5

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

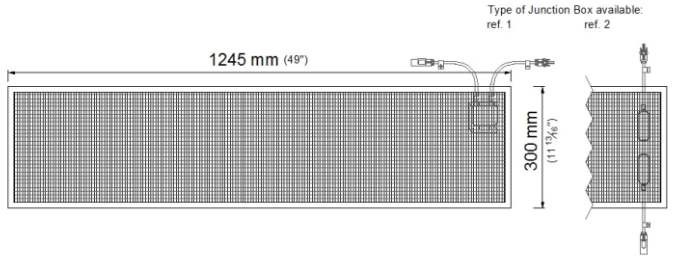
Mechanical description		
Length	mm	1245
Width	mm	300
Thickness	mm	6,85 (EVA) 7,16 (PVB)
Surface area	sqm	0,37
Weight	Kg	6,00
Cell type		a-Si Thin Film
PV Glass		3,2 mm Float Glass
Rear Glass		3,2 mm Float Glass
Thickness encapsulation	ref. A	0,45 mm EVA Foils
	ref. B	0,76 mm PVB Foils

Junction Box		
Protection		IP65
Wiring Section		2,5 mm² or 4,0 mm²
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40…+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

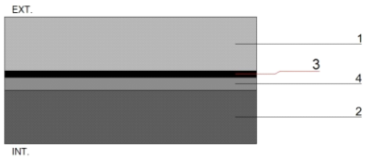
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	033*N-12450300-**-***						
* Type of encapsulation		** Transparence degree				*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20%	**ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30%	**ref. 30**	1-rail junction box	**ref. 2**

PV GLASS DIMENSIONS



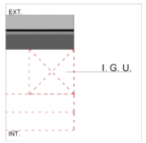
PV GLASS CONFIGURATION



1 PV Glass
2 Rear Glass
3 Cell type
4 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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PHOTOVOLTAIC GLASS				033_N-12000600-_ _-_	
1200 x 600 mm		ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp}(Wp)	44,23	34,02	28,58	25,17
Open-circuit voltage	V_{oc}(V)	45,35	45,35	45,34	45,35
Short-circuit current	I_{sc}(A)	1,45	1,11	0,94	0,80
Voltage at nominal power	V_{mpp}(V)	34,02	34,02	34,02	34,02
Current at nominal power	I_{mpp}(A)	1,30	1,00	0,84	0,74
Power tolerance not to exceed	%	±5	±5	±5	±5

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

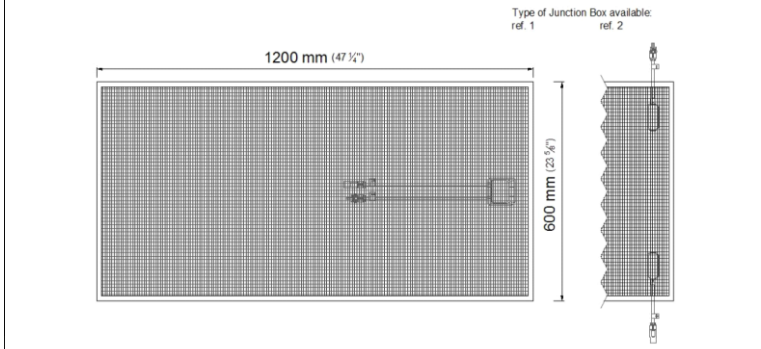
Mechanical description		
Length	mm	1200
Width	mm	600
Thickness	mm	6,85 (EVA) 7,16 (PVB)
Surface area	sqm	0,72
Weight	Kg	11,52
Cell type		a-Si Thin Film
PV Glass		3,2 mm Float Glass
Rear Glass		3,2 mm Float Glass
Thickness encapsulation	ref. A	0,45 mm EVA Foils
	ref. B	0,76 mm PVB Foils

Junction Box		
Protection		IP65
Wiring Section		2,5 mm² or 4,0 mm²
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

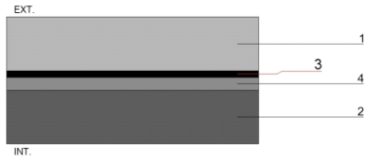
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	033_N-12450300-**-_-***						
* Type of encapsulation		** Transparence degree				*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20%	**ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30%	**ref. 30**	1-rail junction box	**ref. 2**

PV GLASS DIMENSIONS



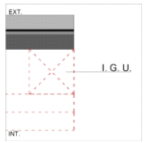
PV GLASS CONFIGURATION



1 PV Glass
2 Rear Glass
3 Cell type
4 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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PHOTOVOLTAIC GLASS				033_N-12450635-_ _-_	
1245 x 635 mm		ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp} (Wp)	48,60	37,44	31,32	27,72
Open-circuit voltage	V_{oc} (V)	48,00	48,00	48,00	48,00
Short-circuit current	I_{sc} (A)	1,50	1,15	0,98	0,83
Voltage at nominal power	V_{mpp} (V)	36,00	36,00	36,00	36,00
Current at nominal power	I_{mpp} (A)	1,35	1,04	0,87	0,77
Power tolerance not to exceed	%	±5	±5	±5	±5

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

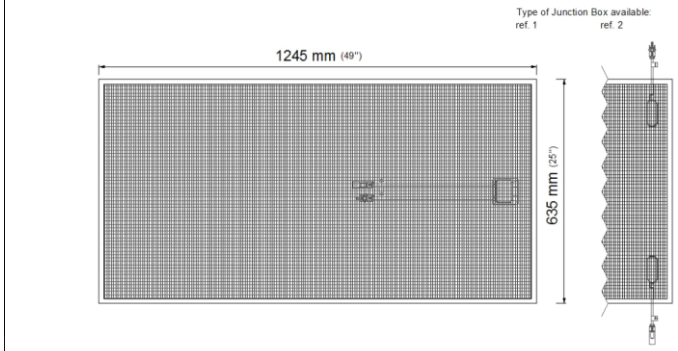
Mechanical description		
Length	mm	1245
Width	mm	635
Thickness	mm	6,85 (EVA) 7,16 (PVB)
Surface area	sqm	0,79
Weight	Kg	12,65
Cell type		a-Si Thin Film
PV Glass		3,2 mm Float Glass
Rear Glass		3,2 mm Float Glass
Thickness encapsulation	ref. A	0,45 mm EVA Foils
	ref. B	0,76 mm PVB Foils

Junction Box		
Protection		IP65
Wiring Section		2,5 mm² or 4,0 mm²
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

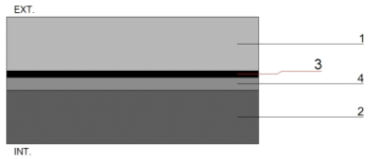
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	033*N-12450300-**-***					
* Type of encapsulation		** Transparence degree				*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20%	**ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30%	**ref. 30**	1-rail junction box	**ref. 2**

PV GLASS DIMENSIONS



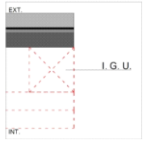
PV GLASS CONFIGURATION



1 PV Glass
2 Rear Glass
3 Cell type
4 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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PHOTOVOLTAIC GLASS				035BN-12450635-_ _-_	
1245 x 635 mm		ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp}(Wp)	48,60	37,44	31,32	27,72
Open-circuit voltage	V_{oc} (V)	48,00	48,00	48,00	48,00
Short-circuit current	I_{sc} (A)	1,50	1,15	0,98	0,83
Voltage at nominal power	V_{mpp} (V)	36,00	36,00	36,00	36,00
Current at nominal power	I_{mpp} (A)	1,35	1,04	0,87	0,77
Power tolerance not to exceed	%	±5	±5	±5	±5

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

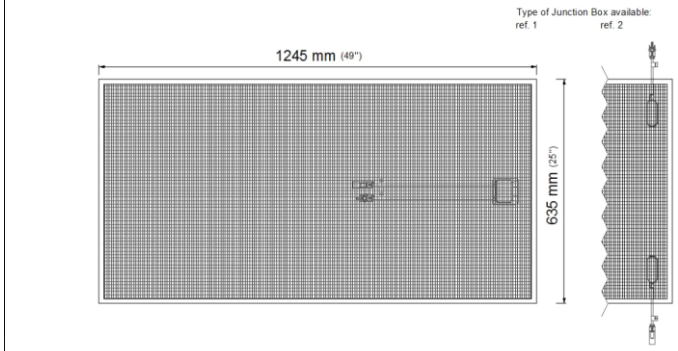
Mechanical description		
Length	mm	1245
Width	mm	635
Thickness	mm	9,72
Surface area	sqm	0,79
Weight	Kg	16,20
Cell type		a-Si Thin Film
PV Glass		3,2 mm Float Glass
Rear Glass		5,0 mm Tempered Glass
Thickness encapsulation	ref. A	EVA Foils (not available)
	ref. B	1,52 mm PVB Foils

Junction Box		
Protection		IP65
Wiring Section		2,5 mm^2 or 4,0 mm^2
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

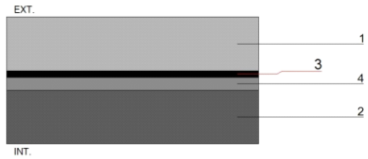
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	033*N-12450300-**-***					
* Type of encapsulation		** Transparence degree			*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20% **ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30% **ref. 30**	1-rail junction box	**ref. 2**

PV GLASS DIMENSIONS



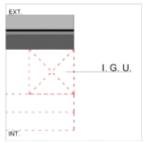
PV GLASS CONFIGURATION



1 PV Glass
2 Rear Glass
3 Cell type
4 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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PHOTOVOLTAIC GLASS		636BN-12451242-_ _-_			
1245 x 1242 mm		ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp}(Wp)	95,18	73,32	61,34	54,29
Open-circuit voltage	V_{oc}(V)	94,00	94,00	94,00	94,00
Short-circuit current	I_{sc}(A)	1,50	1,15	0,98	0,83
Voltage at nominal power	V_{mpp}(V)	70,50	70,50	70,50	70,50
Current at nominal power	I_{mpp}(A)	1,35	1,04	0,87	0,77
Power tolerance not to exceed	%	±5	±5	±5	±5

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

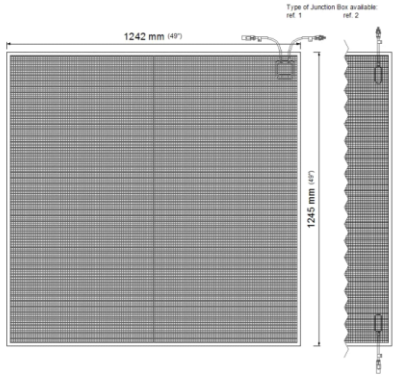
Mechanical description		
Length	mm	1245
Width	mm	1242
Thickness	mm	18,24
Surface area	sqm	1,55
Weight	Kg	58,90
Cell type		a-Si Thin Film
Front Glass		6 mm Tempered Glass
PV Glass		3,2 mm Float Glass
Rear Glass		6 mm Tempered Glass
Thickness encapsulation	ref. A	EVA Foils (not available)
	ref. B	3,04 mm PVB Foils

Junction Box		
Protection		IP65
Wiring Section		2,5 mm^2 or 4,0 mm^2
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

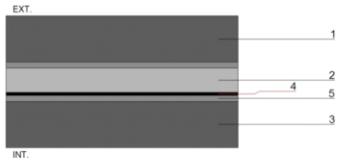
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	033*N-12450300-**-***					
* Type of encapsulation		** Transparence degree				*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20%	**ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30%	**ref. 30**	1-rail junction box	**ref. 2**

PV GLASS DIMENSIONS



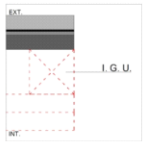
PV GLASS CONFIGURATION



1 Front Glass
2 PV Glass
3 Rear Glass
4 Cell type
5 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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PHOTOVOLTAIC GLASS				636BN-24620635-_ _-_	
2462 x 635 mm		ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp}(Wp)	96,12	74,16	61,92	54,72
Open-circuit voltage	V_{oc} (V)	48,00	48,00	48,00	48,00
Short-circuit current	I_{sc} (A)	2,97	2,27	1,93	1,64
Voltage at nominal power	V_{mpp} (V)	36,00	36,00	36,00	36,00
Current at nominal power	I_{mpp} (A)	2,67	2,06	1,72	1,52
Power tolerance not to exceed	%	±5	±5	±5	±5

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

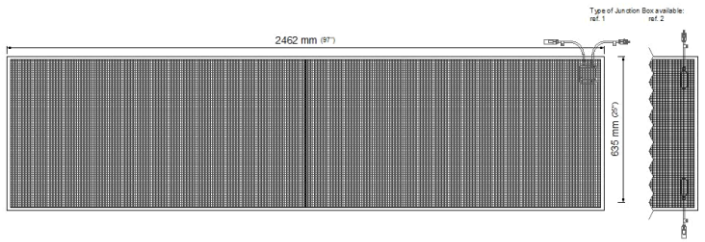
Mechanical description		
Length	mm	2462
Width	mm	635
Thickness	mm	18,24
Surface area	sqm	1,56
Weight	Kg	59,28
Cell type		a-Si Thin Film
Front Glass		6 mm Tempered Glass
PV Glass		3,2 mm Float Glass
Rear Glass		6 mm Tempered Glass
Thickness encapsulation	ref. A	EVA Foils (not available)
	ref. B	3,04 mm PVB Foils

Junction Box		
Protection		IP65
Wiring Section		2,5 mm^2 or 4,0 mm^2
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

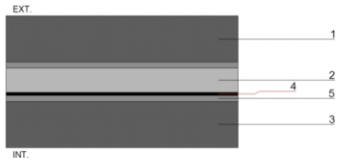
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	033*N-12450300-**-_***					
* Type of encapsulation		** Transparence degree				*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20%	**ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30%	**ref. 30**	1-rail junction box	**ref. 2**

PV GLASS DIMENSIONS



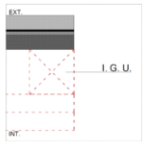
PV GLASS CONFIGURATION



1 Front Glass
2 PV Glass
3 Rear Glass
4 Cell type
5 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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140430

PHOTOVOLTAIC GLASS 1245 x 1849 mm		636BN-12451849-_ _-_ ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp}(Wp)	141,75	109,20	91,35	80,85
Open-circuit voltage	V_{oc}(V)	140,00	140,00	140,00	140,00
Short-circuit current	I_{sc}(A)	1,50	1,15	0,98	0,83
Voltage at nominal power	V_{mpp}(V)	105,00	105,00	105,00	105,00
Current at nominal power	I_{mpp}(A)	1,35	1,04	0,87	0,77
Power tolerance not to exceed	%	±5	±5	±5	±5

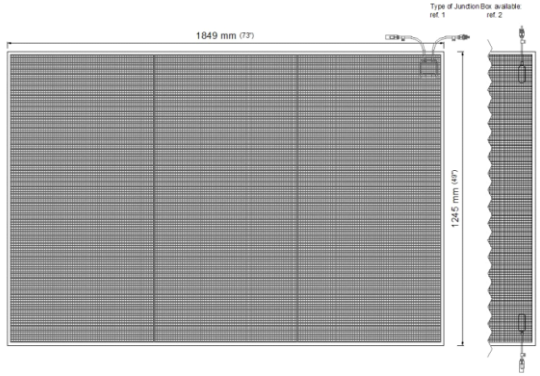
STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

Mechanical description		
Length	mm	1245
Width	mm	1849
Thickness	mm	18,24
Surface area	sqm	2,30
Weight	Kg	87,40
Cell type		a-Si Thin Film
Front Glass		6 mm Tempered Glass
PV Glass		3,2 mm Float Glass
Rear Glass		6 mm Tempered Glass
Thickness encapsulation	ref. A	EVA Foils (not available)
	ref. B	3,04 mm PVB Foils

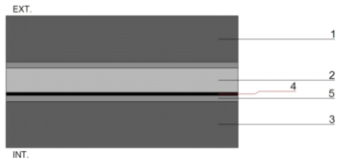
Junction Box		
Protection		IP65
Wiring Section		2,5 mm^2 or 4,0 mm^2
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

* All technical specifications are subject to change without notice by Onyx Solar

PV GLASS DIMENSIONS



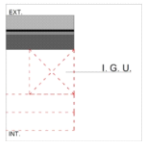
PV GLASS CONFIGURATION



1 Front Glass
2 PV Glass
3 Rear Glass
4 Cell type
5 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



Ref code:	033*N-12450300-**-***						
* Type of encapsulation		** Transparence degree				*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20%	**ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30%	**ref. 30**	1-rail junction box	**ref. 2**

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140430

PHOTOVOLTAIC GLASS 1245 x 2456 mm		636BN-12452456-_ _-_ ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp}(Wp)	189,00	145,60	121,80	107,80
Open-circuit voltage	V_{oc}(V)	185,00	185,00	185,00	185,00
Short-circuit current	I_{sc}(A)	1,50	1,15	0,98	0,83
Voltage at nominal power	V_{mpp}(V)	140,00	140,00	140,00	140,00
Current at nominal power	I_{mpp}(A)	1,35	1,04	0,87	0,77
Power tolerance not to exceed	%	±5	±5	±5	±5

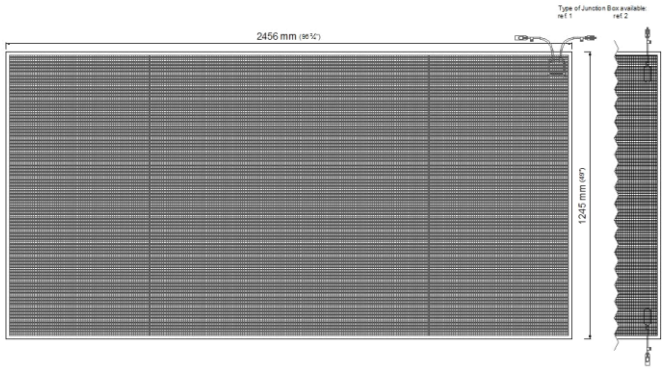
STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

Mechanical description		
Length	mm	1245
Width	mm	2456
Thickness	mm	18,24
Surface area	sqm	3,06
Weight	Kg	116,28
Cell type		a-Si Thin Film
Front Glass		6 mm Tempered Glass
PV Glass		3,2 mm Float Glass
Rear Glass		6 mm Tempered Glass
Thickness encapsulation	ref. A	EVA Foils (not available)
	ref. B	3,04 mm PVB Foils

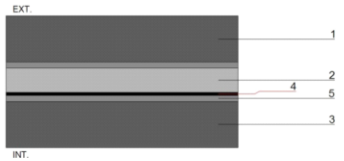
Junction Box		
Protection		IP65
Wiring Section		2,5 mm^2 or 4,0 mm^2
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

* All technical specifications are subject to change without notice by Onyx Solar

PV GLASS DIMENSIONS



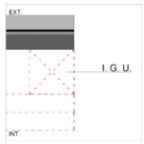
PV GLASS CONFIGURATION



1 Front Glass
2 PV Glass
3 Rear Glass
4 Cell type
5 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



Ref code:	033*N-12450300-**-***						
* Type of encapsulation		** Transparence degree				*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20%	**ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30%	**ref. 30**	1-rail junction box	**ref. 2**

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4. TECHNICAL DATA SHEETS: CRYSTALLINE PV GLASS

FICHAS TÉCNICAS: VIDRIO FV SILICIO CRISTALINO

FICHES TECHNIQUES: VERRE PV EN SILICIUM CRISTALLIN

SCHEDE TECNICHE: VETRO FV SILICIO CRISTALLINO

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PHOTOVOLTAIC GLASS		04TA_-16410989-_ _-_	
1641 x 989 mm		ref. M	ref. P
Electrical data test conditions (STC)		**6" Mono-Crystalline**	**6" Poly-Crystalline**
Nominal peak power	P_{mpp}(Wp)	240,58	225,02
Open-circuit voltage	V_{oc}(V)	37,10	37,30
Short-circuit current	I_{sc}(A)	8,50	8,20
Voltage at nominal power	V_{mpp}(V)	30,30	29,30
Current at nominal power	I_{mpp}(A)	7,94	7,68
Power tolerance not to exceed	%	±3	±3

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

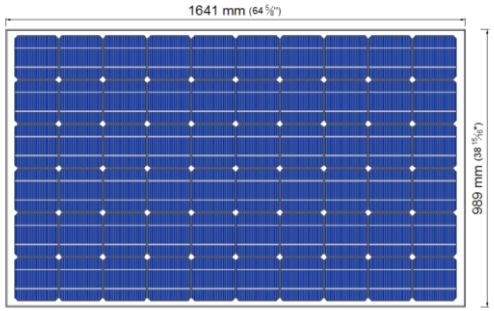
Mechanical description			
Length	mm	1641	
Width	mm	989	
Thickness	mm	5,90 (Glass) 46,00 (Module)	
Surface area	sqm	1,62	
Weight	Kg	23,50	
Cell type (no PV cells)		6" Mono-Cryst. (60)	6" Poly-Cryst. (60)
PV Glass		4,0 mm Tempered Glass	
Rear Layer		1,0 mm TEDLAR/PYE	
Thickness encapsulation	ref. A	0,90 mm EVA Foils	
	ref. B	PVB Foils (not available)	

Junction Box			
Protection		IP65	
Wiring Section		2,5 mm^2 or 4,0 mm^2	
Limits			
Maximum system voltage	V_{sys} (V)	1.000	
Operating module temperature	°C	-40...+85	
Temperature Coefficients			
Temperature Coefficient of P_{mpp}	%/°C	-0,49	-0,43
Temperature Coefficient of V_{oc}	%/°C	-0,35	-0,343
Temperature Coefficient of I_{sc}	%/°C	+0,045	+0,027

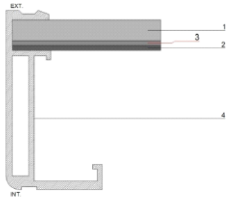
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	**0*A**-16410989-***-****						
* Glass configuration				** Transparence degree		*** Transparence degree	
Glass-Tedlar	**ref. 4T**			White	**ref. A**	White	**ref. 00**
44 Tempered Glass	**ref. 44**	66 Tempered Glass	**ref. 66**	Transparent	**ref. B**	Transparent	**ref. 15**
55 Tempered Glass	**ref. 55**	88 Tempered Glass	**ref. 88**	Colors	**ref. C**	Colors	**ref. 00**
**** Type of PV cells		6" Mono-Crystalline	**ref. M**	6" Poly-Crystalline	**ref. P**	5" Mono-Transp.	**ref. T**

PV GLASS DIMENSIONS



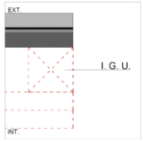
PV GLASS CONFIGURATION



1 PV Glass
2 Rear Layer
3 Cell type
4 Aluminium frame

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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PHOTOVOLTAIC GLASS 1475 x 480 mm		04TA_-14750480-_ _-_ ref. M	ref. P
Electrical data test conditions (STC)		**6" Mono-Crystalline**	**6" Poly-Crystalline**
Nominal peak power	P_{mpp}(Wp)	68,28	62,14
Open-circuit voltage	V_{oc}(V)	10,05	9,78
Short-circuit current	I_{sc}(A)	8,62	8,04
Voltage at nominal power	V_{mpp}(V)	8,43	8,22
Current at nominal power	I_{mpp}(A)	8,10	7,56
Power tolerance not to exceed	%	±3	±3

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

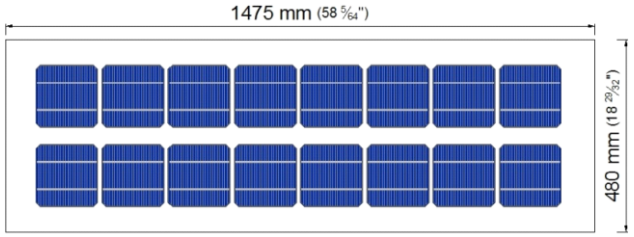
Mechanical description			
Length	mm	1475	
Width	mm	480	
Thickness	mm	5,90 (Glass) 46,00 (Module)	
Surface area	sqm	0,70	
Weight	Kg	10,00	
Cell type (no PV cells)		6" Mono-Cryst (16)	6" Poly-Cryst (16)
PV Glass		4,0 mm Tempered Glass	
Rear Layer		1,0 mm TEDLAR/PYE	
Thickness encapsulation	ref. A	0,90 mm EVA Foils	
	ref. B	PVB Foils (not available)	

Junction Box		
Protection		IP65
Wiring Section		2,5 mm^2 or 4,0 mm^2
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,49 / -0,43
Temperature Coefficient of V_{oc}	%/°C	-0,35 / -0,343
Temperature Coefficient of I_{sc}	%/°C	+0,045 / +0,027

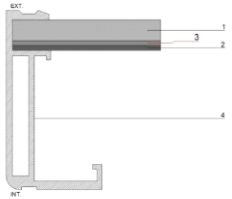
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	**0*A**-16410989-***-****						
* Glass configuration				** Transparence degree		*** Transparence degree	
Glass-Tedlar	**ref. 4T**			White	**ref. A**	White	**ref. 00**
44 Tempered Glass	**ref. 44**	66 Tempered Glass	**ref. 66**	Transparent	**ref. B**	Transparent	**ref. 15**
55 Tempered Glass	**ref. 55**	88 Tempered Glass	**ref. 88**	Colors	**ref. C**	Colors	**ref. 00**
**** Type of PV cells		6" Mono-Crystalline	**ref. M**	6" Poly-Crystalline	**ref. P**	5" Mono-Transp.	**ref. T**

PV GLASS DIMENSIONS



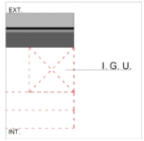
PV GLASS CONFIGURATION



1 PV Glass
2 Rear Layer
3 Cell type
4 Aluminium frame

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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140430

PHOTOVOLTAIC GLASS			044A_-14750480-_ _-_
1475 x 480 mm		ref. M	ref. P
Electrical data test conditions (STC)		**6" Mono-Crystalline**	**6" Poly-Crystalline**
Nominal peak power	P_{mpp}(Wp)	68,28	62,14
Open-circuit voltage	V_{oc}(V)	10,05	9,78
Short-circuit current	I_{sc}(A)	8,62	8,04
Voltage at nominal power	V_{mpp}(V)	8,43	8,22
Current at nominal power	I_{mpp}(A)	8,10	7,56
Power tolerance not to exceed	%	±10	±10

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

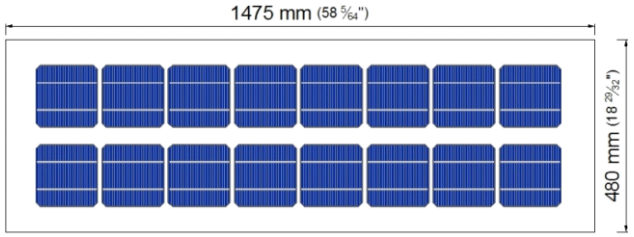
Mechanical description			
Length	mm	1475	
Width	mm	480	
Thickness	mm	9,80	
Surface area	sqm	0,70	
Weight	Kg	14,00	
Cell type (no PV cells)		6" Mono-Cryst (16)	6" Poly-Cryst (16)
Front Glass		4,0 mm Tempered Glass	
Rear Glass		4,0 mm Tempered Glass	
Thickness encapsulation	ref. A	1,80 mm EVA Foils	
	ref. B	PVB Foils (not available)	

Junction Box		
Protection		IP65
Wiring Section		2,5 mm^2 or 4,0 mm^2
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,451
Temperature Coefficient of V_{oc}	%/°C	-0,361
Temperature Coefficient of I_{sc}	%/°C	+0,08

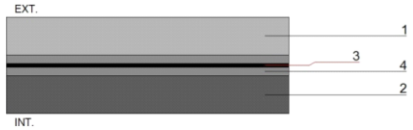
* All technical specifications are subject to change without notice by Onyx Solar

Ref code: 0*A**-16410989-***-****					
* Glass configuration			** Transparence degree	*** Transparence degree	
Glass-Tedlar	**ref. 4T**		White **ref. A**	White	**ref. 00**
44 Tempered Glass	**ref. 44**	66 Tempered Glass **ref. 66**	Transparent **ref. B**	Transparent	**ref. 15**
55 Tempered Glass	**ref. 55**	88 Tempered Glass **ref. 88**	Colors **ref. C**	Colors	**ref. 00**
**** Type of PV cells	6" Mono-Crystalline **ref. M**		6" Poly-Crystalline **ref. P**	5" Mono-Transp.	**ref. T**

PV GLASS DIMENSIONS



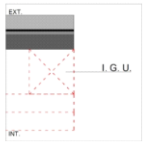
PV GLASS CONFIGURATION



1 Front Glass
2 Rear Glass
3 Cell type
4 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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PHOTOVOLTAIC GLASS 1650 x 850 mm		0_ _A_-16500850-_ _-_ ref. M	ref. P	ref. T
Electrical data test conditions (STC)		**6" Mono-Cryst.**	**6" Poly-Cryst.**	**5" Mono-Transp.**
Nominal peak power	P_{mpp}(Wp)	147,63	139,86	161,00
Open-circuit voltage	V_{oc}(V)	22,50	22,00	44,00
Short-circuit current	I_{sc}(A)	8,50	8,00	5,24
Voltage at nominal power	V_{mpp}(V)	18,50	18,50	35,00
Current at nominal power	I_{mpp}(A)	7,98	7,56	4,60
Power tolerance not to exceed	%	±10	±10	±10

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

Mechanical description				
Length	mm	1650		
Width	mm	850		
Thickness	mm	9,80 / 11,80 / 13,80 / 17,80		
Surface area	sqm	1,40		
Weight	Kg	28,00 / 35,00 / 42,00 / 56,00		
Cell type (no PV cells)		6" Mono-C. (36)	6" Poly-C. (36)	5" Mono-T. (72)
Front Glass		4,0 / 5,0 / 6,0 / 8,0 Tempered Glass		
Rear Glass		4,0 / 5,0 / 6,0 / 8,0 Tempered Glass		
Thickness encapsulation	ref. A	1,80 mm EVA Foils		
	ref. B	PVB Foils (not available)		

Junction Box				
Protection		IP65		
Wiring Section		2,5 mm^2 or 4,0 mm^2		
Limits				
Maximum system voltage	V_{sys} (V)	1.000		
Operating module temperature	°C	-40...+85		
Temperature Coefficients				
Temperature Coefficient of P_{mpp}	%/°C	-0,451	-0,451	-0,45
Temperature Coefficient of V_{oc}	%/°C	-0,361	-0,361	-0,33
Temperature Coefficient of I_{sc}	%/°C	+0,08	+0,08	+0,042

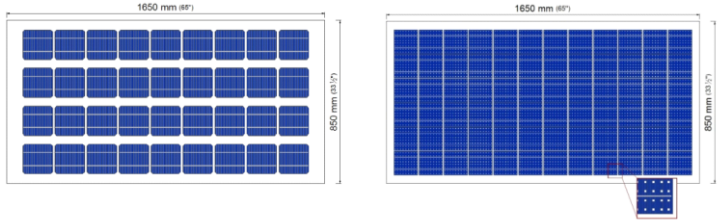
* All technical specifications are subject to change without notice by Onyx Solar

Ref code: 0*A**-16410989-***-****					
* Glass configuration			** Transparence degree	*** Transparence degree	
Glass-Tedlar	**ref. 4T**		White **ref. A**	White	**ref. 00**
44 Tempered Glass	**ref. 44**	66 Tempered Glass **ref. 66**	Transparent **ref. B**	Transparent	**ref. 15**
55 Tempered Glass	**ref. 55**	88 Tempered Glass **ref. 88**	Colors **ref. C**	Colors	**ref. 00**
**** Type of PV cells		6" Mono-Crystalline **ref. M**	6" Poly-Crystalline **ref. P**	5" Mono-Transp.	**ref. T**

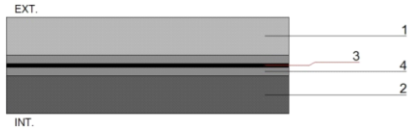
PV GLASS DIMENSIONS

6" Mono-Crystalline (36 PV cells) ref. M
6" Poly-Crystalline (36 PV cells) ref. P

5" Mono-Crystalline Transparent (72 PV cells) ref. T



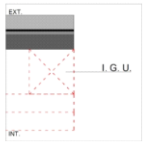
PV GLASS CONFIGURATION



1 Front Glass
2 Rear Glass
3 Cell type
4 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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PHOTOVOLTAIC GLASS		088AB-19311511-20-T
1931 x 1511 mm		ref. T
Electrical data test conditions (STC)		**5" Mono-Crystalline Transparent**
Nominal peak power	P_{mpp} (Wp)	321,30
Open-circuit voltage	V_{oc} (V)	33,00
Short-circuit current	I_{sc} (A)	13,20
Voltage at nominal power	V_{mpp} (V)	27,00
Current at nominal power	I_{mpp} (A)	11,90
Power tolerance not to exceed	%	±10

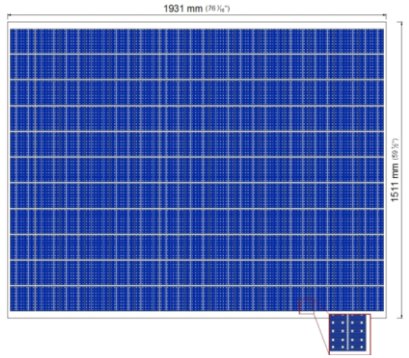
STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

Mechanical description		
Length	mm	1931
Width	mm	1511
Thickness	mm	17,80
Surface area	sqm	2,92
Weight	Kg	116,80
Cell type (no PV cells)		5" Mono-Crystalline Transparent (165)
Front Glass		8,0 mm Tempered Glass
Rear Glass		8,0 mm Tempered Glass
Thickness encapsulation	ref. A	1,80 mm EVA Foils
	ref. B	PVB Foils (not available)

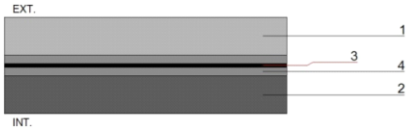
Junction Box		
Protection		IP65
Wiring Section		2,5 mm^2 or 4,0 mm^2
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,45
Temperature Coefficient of V_{oc}	%/°C	-0,33
Temperature Coefficient of I_{sc}	%/°C	+0,042

* All technical specifications are subject to change without notice by Onyx Solar

PV GLASS DIMENSIONS



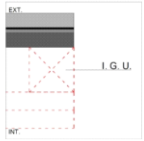
PV GLASS CONFIGURATION



1 Front Glass
2 Rear Glass
3 Cell type
4 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Optional: Insulating Glass Unit. U value (W/sqm.K), please go to:
Technical Guide. 7.-Insulating Glass Unit.
* Junction box type and configuration should be analyzed as per clients request or project needs.



Ref code:	**0*A**-16410989-***-***					
* Glass configuration			** Transparence degree		*** Transparence degree	
Glass-Tedlar	**ref. 4T**		White	**ref. A**	White	**ref. 00**
44 Tempered Glass	**ref. 44**	66 Tempered Glass **ref. 66**	Transparent	**ref. B**	Transparent	**ref. 15**
55 Tempered Glass	**ref. 55**	88 Tempered Glass **ref. 88**	Colors	**ref. C**	Colors	**ref. 00**
**** Type of PV cells		6" Mono-Crystalline **ref. M**	6" Poly-Crystalline	**ref. P**	5" Mono-Transp.	**ref. T**

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5. TECHNICAL DATA SHEETS: FLOOR PV GLASS

FICHAS TECNICAS: SUELO TRANSITABLE FOTOVOLTAICO

FICHES TECHNIQUES: SOL PHOTOVOLTAIQUE PRATICABLE

SCHEDE TECNICHE: SUOLO PEDONABILE FOTOVOLTAICO

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PHOTOVOLTAIC GLASS				636BN-06000600-_ _-_	
600 x 600 mm		ref. 00	ref. 10	ref. 20	ref. 30
Electrical data test conditions (STC)		**CLEAR-0%**	**CLEAR-10%**	**CLEAR-20%**	**CLEAR-30%**
Nominal peak power	P_{mpp}(Wp)	22,11	17,01	14,29	12,59
Open-circuit voltage	V_{oc} (V)	45,35	45,35	45,35	45,35
Short-circuit current	I_{sc} (A)	0,72	0,55	0,47	0,40
Voltage at nominal power	V_{mpp} (V)	34,02	34,02	34,02	34,02
Current at nominal power	I_{mpp} (A)	0,65	0,50	0,42	0,37
Power tolerance not to exceed	%	±5	±5	±5	±5

STC: 1000 w/m², AM 1.5 and a cell temperature of 25°C, stabilized module state.

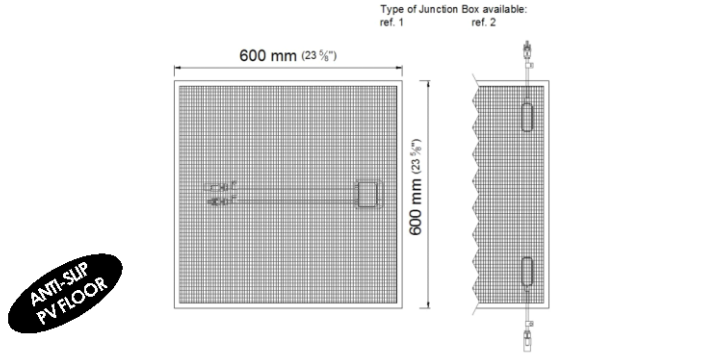
Mechanical description		
Length	mm	600
Width	mm	600
Thickness	mm	16,72
Surface area	sqm	0,36
Weight	Kg	14,40
Cell type		a-Si Thin Film
Front Glass		6 mm Anti-Slip Glass
PV Glass		3,2 mm Float Glass
Rear Glass		6 mm Tempered Glass
Thickness encapsulation	ref. A	EVA Foils (not available)
	ref. B	1,52 mm PVB Foils

Junction Box		
Protection		IP65
Wiring Section		2,5 mm² or 4,0 mm²
Limits		
Maximum system voltage	V_{sys} (V)	1.000
Operating module temperature	°C	-40...+85
Temperature Coefficients		
Temperature Coefficient of P_{mpp}	%/°C	-0,19
Temperature Coefficient of V_{oc}	%/°C	-0,28
Temperature Coefficient of I_{sc}	%/°C	+0,09

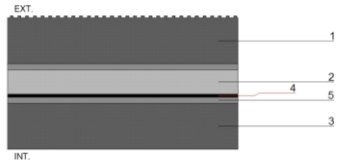
* All technical specifications are subject to change without notice by Onyx Solar

Ref code:	033*N-12450300-**-***					
* Type of encapsulation		** Transparence degree				*** Type of junction box	
EVA Foils	**ref. A**	Dark Clear-0%	**ref. 00**	M Clear-20%	**ref. 20**	Standard rear	**ref. 1**
PVB Foils	**ref. B**	S Clear-10%	**ref. 10**	L Clear-30%	**ref. 30**	1-rail junction box	**ref. 2**

PV GLASS DIMENSIONS



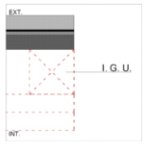
PV GLASS CONFIGURATION



1 Front Glass
2 PV Glass
3 Rear Glass
4 Cell type
5 Encapsulation type
EVA Foils ref. A
PVB Foils ref. B

NOTES

* For optical and further mechanical properties, please go to:
Technical Guide. 6.-Other Properties.
* Junction box type and configuration should be analyzed as per clients request or project needs.



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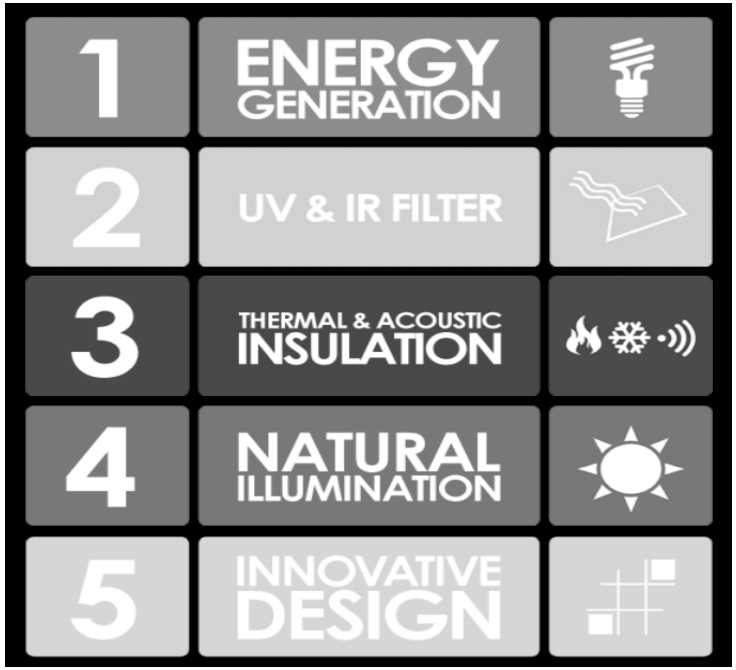
6. OTHER PROPERTIES

OTRAS PROPIEDADES



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PROPERTIES		GLASS 3+3				GLASS 6T+3+6T			
STANDARDS		0%	10%	20%	30%	0%	10%	20%	30%
PEAK POWER	(Wp/m^2)	61,5	47,5	39,6	35,1	61,5	47,5	39,6	35,1
SPECIFIC WEIGHT	(Kg/m^2)	16,7	16,7	16,7	16,7	41	41	41	41
THERMAL TRANSMITTANCE (U value) UNE-EN 673:1998	(W/m^2K)	5,7	5,7	5,7	5,7	5,2	5,2	5,2	5,2
SOLAR FACTOR (g) UNE-EN 410:2011		22,00%	29,00%	34,00%	41,00%	23,00%	29,00%	32,00%	37,00%
TRANSMISSION UV UNE-EN 410:1998		0,00%	1,50%	1,50%	4,70%	0,00%	0,10%	0,30%	0,40%
SOLAR TRANSMISSION UNE-EN 410:1998		0,20%	9,40%	15,00%	24,30%	0,00%	7,40%	11,50%	18,60%
LIGHT TRANSMISSION UNE-EN 410:1998		0,20%	10,80%	17,30%	28,40%	0,00%	10,10%	16,30%	26,70%
LIGHT REFLECTION (PHOTOACTIVE SIDE) UNE-EN 410:1998		7,60%	8,30%	7,60%	8,20%	7,30%	7,30%	7,00%	7,10%
LIGHT REFLECTION (INNER SIDE) UNE-EN 410:1998		61,00%	52,90%	47,80%	37,90%	52,00%	49,30%	44,40%	34,30%
SOLAR REFLECTION (PHOTOACTIVE SIDE) UNE-EN 410:1998		14,80%	13,90%	11,10%	12,40%	11,50%	10,20%	8,50%	9,00%
SOLAR REFLECTION (INNER SIDE) UNE-EN 410:1998		60,00%	52,20%	46,70%	37,90%	43,00%	41,10%	35,80%	28,50%
FIRE REACTION Standard classification UNE-EN 13501-1:2007 UNE-EN 13823:2002 / ISO 11925-2:2002		B-s1,d0	B-s1,d0	B-s1,d0	B-s1,d0	B-s1,d0	B-s1,d0	B-s1,d0	B-s1,d0
RESISTENCE TO SOFT BODY IMPACT UNE-EN 12600:2003		2(B)2	2(B)2	2(B)2	2(B)2	1(B)1	1(B)1	1(B)1	1(B)1
TEMPERED GLASS STANDARDS UNE-EN 12150		Not Aplicable				Comply with UNE-EN12150			
ACOUSTIC ATTENUATION UNE-EN 12578:2002	dB	32(-1;-3)	32(-1;-3)	32(-1;-3)	32(-1;-3)	34(-1;-3)	34(-1;-3)	34(-1;-3)	34(-1;-3)
RESISTENCE TO EFFRACTION UNE-EN 356:2001		Not Aplicable				P3A	P3A	P3A	P3A
HIGH TEMPERATURE TEST UNE-EN ISO 12543-4:1998		APPROVED				APPROVED			
RADIATION TEST UNE-EN ISO 12543-4:1998		APPROVED				APPROVED			
ACCELERATED AGING TEST UNE- EN 4892-2:2006		APPROVED				APPROVED			

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DEPENDING ON THE FINAL BIPV GLASS CONFIGURATION, IT CAN COMPLY WITH THE FOLLOWING STANDARDS:

Photovoltaic glass:

- EN 12600:2003. Glass in building - Pendulum test - Impact test method and classification for flat glass.
- ISO 12543-4:2011. Glass in building - Laminated glass and laminated safety glass.
- EN 13501:2007. Fire classification of construction products and building elements.
- EN 356:2001. Resistance against hand stroke.
- EN 410:2011. Glass in building - Determination of luminous and solar characteristics of glazing.
- EN 12150:2005. Glass in building - Thermally toughened soda lime silicate safety glass.

DEPENDIENDO DE LA CONFIGURACION FINAL, EL VIDRIO FV PUEDE CUMPLIR CON LAS SIGUIENTES NORMATIVAS:

Vidrio Fotovoltaico:

- EN 12600:2003. Vidrio para la edificación. Ensayo pendular. Método de ensayo al impacto y clasificación para vidrio plano.
- ISO 12543-4:2011. Vidrio para la edificación. Vidrio laminado y vidrio laminado de seguridad.
- EN 13501:2007. Clasificación en función del comportamiento frente al fuego de los productos de construcción y elementos para la edificación.
- EN 356:2001. Vidrio de construcción. Vidrio de seguridad. Ensayo y clasificación de la resistencia al ataque manual.
- EN 410:2011. Vidrio para la edificación. Determinación de las características luminosas y solares de los acristalamientos.
- EN 12150:2005. Vidrio para edificación - Vidrio de silicato sodocálcico de seguridad templado térmicamente.

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PVB Interlayers:

- ANSI Z97.1. Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.
- ASTM D792. Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
- ASTM E1269. Standard Test Method for Determining Specific Heat Capacity by Differential Scanning Calorimetry.
- ASTM D1004. Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
- ASTM D542. Standard Test Method for Index of Refraction of Transparent Organic Plastics.
- ASTM E1354. Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter.
- ASTM F433. Standard Practice for Evaluating Thermal Conductivity of Gasket Materials.
- ASTM D1929. Standard Test Method for Determining Ignition Temperature of Plastics.
- EN 410:2011. Glass in building - Determination of luminous and solar characteristics of glazing.
- JIS K6771. Flexible vinyl tube.

Encapsulante PVB:

- ANSI Z97.1. Materiales de Vidrio de Seguridad usados en Edificación - Especificaciones de Desempeño de Seguridad y Métodos de Prueba.
- ASTM D792. Métodos de Prueba Estándar para la Densidad y Gravedad específica (Densidad Relativa) de plásticos por Desplazamiento.
- ASTM E1269. Método de Prueba Estándar para determinar la capacidad calorífica específica mediante Análisis Térmico Diferencial.
- ASTM D1004. Método de Prueba Estándar para la Resistencia al Desgarro de láminas de plástico.
- ASTM D542. Método de Prueba Estándar para medir el Índice de refracción de plásticos orgánicos transparentes.
- ASTM E1354. Método de prueba estándar para el calor y las tasas de emisiones visibles de humo Materiales y Productos usando un calorímetro de consumo de oxígeno.
- ASTM F433. Práctica estándar para la evaluación de la conductividad térmica de los materiales de las juntas.
- ASTM D1929. Método de prueba estándar para determinar la temperatura de ignición de los plásticos.
- EN 410:2011. Vidrio para la edificación. Determinación de las características luminosas y solares de los acristalamientos
- JIS K6771. Tubo flexible de vinilo.

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One Rail Junction Box:

- UL approved.
- TÜV approved to IEC 61215 ed. 2 approved.

Anti-Slip:

- UNE ENV 12633:2003. Method of determination of unpolished and polished slip/skid resistance value.
- DIN 51130: Ramp Method Standard Footwear.
- DIN 51097: Ramp Method Barefoot.
- ASTM C 1028-07: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.

Caja de conexiones Monopolar:

- UL aprobada.
- TÜV aprobada para IEC 61215 ed. 2 aprobada.

Anti-Deslizante:

- UNE ENV 12633:2003. Método para la determinación del valor de la resistencia al deslizamiento/resbalamiento de los pavimentos pulidos y sin pulir.
- DIN 51130: Método de rampa, Pies calzados.
- DIN 51097: Método de rampa, Pies descalzos.
- ASTM C 1028-07: Método de prueba estándar para determinar el coeficiente de fricción estática de Baldosa Cerámicas y Otras superficies similares por el método de Dinamómetro Horizontal.

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FLOOR GLASS CERTIFICATION	DESCRIPTION	
UNE ENV 12633	Pendulum method	Class 3
DIN 51130	Ramp method Shod foot	R-12
DIN 51097	Ramp method Bare foot	Class B
ASTM C 1028-07	Coefficient Dry	≥0,7
	Coefficient Wet	≥0,6
EN 101:91 MOHS	Surface hardness	Scale 4
UL 410	Slip coefficient	> 0,6

STANDARDS AND CERTIFICATIONS FOR PV FLOOR GLASS

ADA requirements of Slip coefficient * Slip resistance is based on the frictional force necessary to keep a shoe heel or crutch tip from slipping on a walking surface under conditions likely to be found on the surface. While the dynamic coefficient of friction during walking varies in a complex and non-uniform way, the static coefficient of friction, which can be measured in several ways, provides a close approximation of the slip resistance of a surface. The Occupational Safety and Health Administration recommend that walking surfaces have a static coefficient of friction of 0.5. A research project sponsored by the Architectural and Transportation Barriers Compliance Board (Access Board) conducted tests with persons with disabilities and concluded that a higher coefficient of friction was needed by such persons. A static coefficient of friction of 0.6 is recommended for accessible routes and 0.8 for ramps.

NORMATIVAS Y CERTIFICACIONES PARA EL SUELO FV

Requisitos de la ADA de Coeficiente de deslizamiento * La resistencia al deslizamiento se basa en la fuerza de fricción necesaria para evitar que el tacón de un zapato o la punta de una muleta se deslicen sobre una superficie transitable bajo condiciones probables de encontrar en esa superficie. Mientras que el coeficiente de fricción dinámico durante la marcha varía de una forma compleja y no uniforme, el coeficiente estático de fricción, que se puede medir de varias maneras, proporciona una estrecha aproximación de la resistencia al deslizamiento de una superficie. La Administración de Seguridad y Salud recomiendan que las superficies transitables tengan un coeficiente de fricción estática de 0,5. Un proyecto de investigación patrocinado por la Junta de Cumplimiento de Barreras Arquitectónicas y de Transporte (Access Board) llevó a cabo pruebas con personas con discapacidad y concluyó que un mayor coeficiente de fricción era necesario para tales personas. Se recomienda un coeficiente estático de fricción de 0,6 para rutas accesibles y 0,8 para las rampas.

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NORMES ET CERTIFICATIONS POUR LE SOL PV

Conditions requises de l'ADA du coefficient de glissement * La résistance au glissement se base sur la force de friction nécessaire pour éviter que le talon d´une chaussure ou la pointe d´une canne glisse sur une surface praticable sous les conditions probables de rencontre sur cette superficie. En même temps le coefficient de friction dynamique durant la marche varie d´une forme complète et non uniforme, le coefficient statique de friction, qui peut se mesurer de plusieurs manières, proportionnant une étroite approximation de la résistance au glissement d´une superficie. L´administration de la sécurité et de la santé recommandent que les superficies praticables aient un coefficient de friction statique de 0.5. Un projet d´investigation sponsorisé par l´assemblée d´exécution des barrières architecturales et de transport (Acces Board), réalise des preuves avec des personnes handicapées et conclue qu´un meilleur coefficient de friction est nécessaire pour ce type de personne. Il recommande un coefficient statique de friction de 0.6 pour des routes accessibles et 0.8 pour les rampes.

NORMATIVE E CERTIFICAZIONI PER IL SUOLO FOTOVOLATICO

Requisiti ADA di coefficiente anti scivolamento * La resistenza all'anti scivolamento si basa sulla forza di frizione necessaria per evitare che il tacco della scarpa o la punta del bastone possano scivolare sulla superficie pedonabile. Il coefficiente di frizione dinamico varia in maniera complessa e non uniforme, il coefficiente di frizione statico, calcolabile con diferenti metodi, mostra una stretta approssimazione della resistenza antiscivolamento della superficie. Le Autorita raccomandano un coefficiente di frizione statica di 0.5. Un progetto di ricerca sviluppato dalla "Junta de Cumplimiento de Barreras Arquitectónicas e Transporte (Access Board)", realizzato con persone con handicap, raccomanda un coefficiente statico di frizione dello 0.6 e dello 0.8 per percorsi inclinati.

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7. INSULATING GLASS UNITS

VIDRIO AISLANTE O DE DOBLE ACRISTALAMIENTO

VERRE ISOLANT OU DOUBLE VITRAGE

VETRO ISOLANTE

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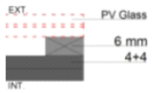
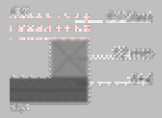
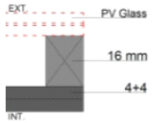
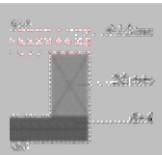
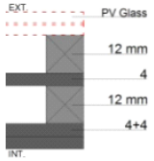
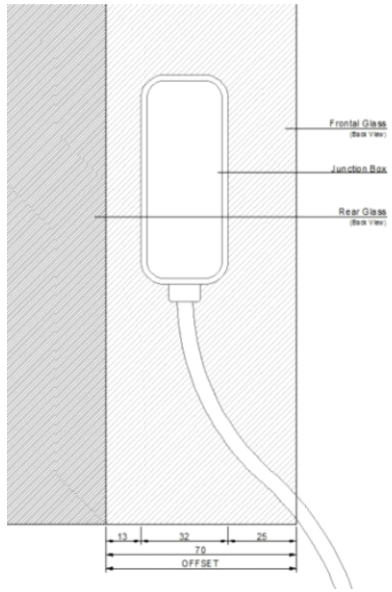
INERT GAS HOUSE		CONFIGURATION CHAMBER	INNER GLASS	U value W/m2ºK
SINGLE SPACER 6 mm		6 mm Air Chamber	4+4 mm	3,2
		6 mm Argon Chamber	4+4 mm	2,9
		6 mm Air Chamber	4+4 mm low-e	2,4
		6 mm Argon Chamber	4+4 mm low-e	1,9
SINGLE SPACER 12 mm		12 mm Air Chamber	4+4 mm	2,7
		12 mm Argon Chamber	4+4 mm	2,6
		12 mm Air Chamber	4+4 mm low-e	1,6
		12 mm Argon Chamber	4+4 mm low-e	1,2
SINGLE SPACER 16 mm		16 mm Air Chamber	4+4 mm	2,6
		16 mm Argon Chamber	4+4 mm	2,5
		16 mm Air Chamber	4+4 mm low-e	1,3
		16 mm Argon Chamber	4+4 mm low-e	1,1
SINGLE SPACER 20 mm		20 mm Air Chamber	4+4 mm	2,7
		20 mm Argon Chamber	4+4 mm	2,5
		20 mm Air Chamber	4+4 mm low-e	1,4
		20 mm Argon Chamber	4+4 mm low-e	1,1
DOUBLE SPACER 12 / 4 / 12 mm		12/4/12 Air Chamber	4+4 mm	1,9
		12/4/12 Argon Chamber	4+4 mm	1,7
		12/4/12 Air Chamber	4+4 mm low-e	1,2
		12/4/12 Argon Chamber	4+4 mm low-e	1,0

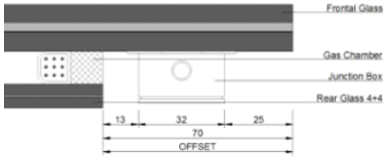
*U Value calculated including frontal glasss configuration of 33.

OFFSET - IGU GLASS

Back View



Section View



*Junction box type and configuration could be adapted for clients request or project needs.

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8. INTERNATIONAL STANDARDS

NORMAS INTERNACIONALES

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- **IEC 61646**: Thin-film terrestrial photovoltaic (PV) modules Design qualification and type approval
- **IEC 61125**: Crystalline silicon terrestrial photovoltaic (PV) modules – Design qualification and type approval
- **IEC 61730-1**: Safety qualification for PV modules of crystalline silicon for construction use.
- **UL 1703**: Flat-Plate Photovoltaic Modules and Panels
- **EN 12600:2003**. Glass in building - Pendulum test - Impact test method and classification for flat glass.
- **ISO 12543-4:2011**. Glass in building - Laminated glass and laminated safety glass
- **EN 13501:2007**. Fire classification of construction products and building elements
- **EN 356:2001**. Resistance against hand stroke
- **EN 410:2011.** Glass in building - Determination of luminous and solar characteristics of glazing.
- **EN 12150:2005.** Glass in building - Thermally toughened soda lime silicate safety glass.
- **EN 12600:2003.** Glass in building - Pendulum test - Impact test method and classification for flat glass

- **IEC 61646:** Módulos fotovoltaicos (FV) de lámina delgada para uso terrestre. Cualificación del diseño y homologación.
- **IEC 61125:** Módulos fotovoltaicos (FV) de silicio cristalino para uso terrestre. Cualificación del diseño y homologación**.**
- **IEC 61730-1:** Cualificación de la seguridad de los módulos fotovoltaicos (FV). Parte 1: Requisitos de construcción.
- **UL 1703*:*** Módulos y Paneles Fotovoltaicos de Placa Plana.
- **ISO 12543-4:2011.** Vidrio para la edificación. Vidrio laminado y vidrio laminado de seguridad.
- **EN 13501:2007.** Clasificación en función del comportamiento frente al fuego de los productos de construcción y elementos para la edificación.
- **EN 356:2001.** Vidrio de construcción. Vidrio de seguridad. Ensayo y clasificación de la resistencia al ataque manual.
- **EN 410:2011.** Vidrio para la edificación. Determinación de las características luminosas y solares de los acristalamientos.
- **EN 12150:2005.** Vidrio para la edificación. Vidrio de silicato sodocálcico de seguridad templado térmicamente.
- **EN 12600:2003.** Vidrio para la edificación. Ensayo pendular. Método de ensayo al impacto y clasificación para vidrio plano.

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Any type of manipulation or installation that is not contained in the norms stipulated in this document and that means a doubt for the installer must be consulted with the supplier company to receive the correspondent information with that regard.

Cualquier tipo de manipulación o instalación que no esté contenida en las normas estipuladas en este documento y que pueda significar alguna duda para el instalador, debe ser consultado con la empresa proveedora para recibir la información correspondiente.

Tout type de manipulation ou d´installation qui n´est pas inscrites dans les normes stipulées dans ce document et qui peuvent engendrer des doutes pour l´installateur, doit consulter l´entreprise qui le fournit pour recevoir l´information correspondante.

Qualsiasi tipo di manipolazione o installazione differente dalla normativa stipulata in questo documento e che puo costituire dubbio di procedimento, dovra essere consultato con il fornitore.

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9. WARRANTY

CERTIFICADO DE GARANTÍA DEL PRODUCTO

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Onyx Solar Energy S.L., company dedicated to the development of BIPV solutions for buildings and other sustainable building solutions, guarantees the quality of the glass/glass modules according to the technical specifications and applicable regulations described in this submittal.
Terms and conditions of the glass/glass PV Module warranty are expressed as follows:

1. WARRANTY DESCRIPTION

A) LIMITED WARRANTY FOR MATERIALS AND MANUFACTURING DEFECTS.

*Onyx Solar Energy S.L guarantees during a period of **5 years**, starting from the initial purchase date, that the PV Module is free from any defect in material or manufacture.*

If, during the WARRANTY term, your PV Module became inoperative as a consequence of any defect in the manufacturing or the materials, Onyx Solar Energy S.L (previously verifying the communicated defect) reserves the right to choose between repairing the defective module, substituting it for an equivalent one or refunding the price of the defective module.

This limited WARRANTY for materials and manufacturing defects does not cover a specific level of power output.

Onyx Solar Energy S.L., empresa dedicada al desarrollo de soluciones de Integración Fotovoltaica para Edificios (BIPV) y otras soluciones sostenibles para la construcción, garantiza la calidad de sus vidrios fotovoltaicos de acuerdo a las especificaciones técnicas y a las legislaciones aplicables descritas en este manual.
Los términos y condiciones de la garantía de los vidrios/módulos de vidrio fotovoltaicos se expresan a continuación:

1. DESCRIPCIÓN DE LA GARANTÍA

A) GARANTÍA PARA MATERIALES POR DEFECTOS DE FABRICACIÓN.

Onyx Solar Energy S.L garantiza durante un periodo de 5 años desde la fecha de compra, que el modulo fotovoltaico está libre de defectos en su materiales o facturación.

Si, en cualquier momento, durante el periodo de validez de esta garantía, el modulo fotovoltaico adquirido resulta inoperativo como consecuencia de cualquier defecto en la fabricación o en los materiales, Onyx Solar Energy S.L (tras verificar el defecto comunicado) se reserva el derecho de elegir entre reparar el modulo defectuoso, substituirlo por uno equivalente o devolver el importe que costó el modulo defectuoso.

Esta GARANTÍA limitada para materiales o defectos de fabricación no cubre un nivel específico de potencia de salida

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B) LIMITED WARRANTY FOR SPECIFIC OUTPUT POWER.

Table below shows the output power value that Onyx Solar Energy S.L guarantees as a minimum value measured under standard conditions[1]

TIME[2]	***OUTPUT POWER VALUE[3]***
10 years	*80%*

(1)1000W/m² solar radiation, cell temperature 25ºC+/- 2ºC and 1.5AM.
(2)Period starting from initial purchase date.
(3) Percentage applied on minimum power specified in this submittal

If Onyx Solar Energy S.L determines, using measuring standard conditions, that the PV Module is not generating the minimum specified output power guaranteed during the term of the warranty, then Onyx Solar Energy S.L reserves the right to choose between repairing the defective module, substituting it for an equivalent one or supplying the additional components to achieve, at least, the guaranteed minimum output power percentage.

B) GARANTÍA LIMITADA PARA GENERACION DE ELECTRICIDAD.

La siguiente tabla muestra el valor de potencia de salida que Onyx Solar Energy S.L garantiza como valor mínimo medido bajo condiciones estandar[1]

DURACIÓN[2]	***VALOR DE LA POTENCIA DE SALIDA[3]***
10 años	*80%*

(1)1000W/m² radiación solar, temperatura de la célula 25ºC+/- 2ºC and 1.5AM.
(2)Periodo que comienza desde la fecha inicial de compra
(3)Porcentaje aplicado a la potencia mínima especificada en este manual.

Si Onyx Solar Energy S.L determina, usando las condiciones estándar medidas, que el modulo fotovoltaico no está generando la potencia de salida mínima especificada garantizada durante la duración de la garantía, entonces Onyx Solar Energy SL se reserva el derecho del reparar el modulo defectuoso, substituirlo por uno equivalente, o proveer los componentes adicionales necesarios para obtener al menos el porcentaje mínimo de potencia de salida garantizado.

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2. GENERAL TERMS.

The following conditions will be applicable to the PV glass/glass modules provided by Onyx Solar Energy S.L for this project and guaranteed according to the section above.

- *Onyx Solar Energy S.L can, according to its own criteria, use pieces or new product or reformed after reparation or substitute the module under this WARRANTY.*
- *Onyx Solar Energy S.L reserves the right to supply a different module to attend the accepted claims in the case that the manufacturing of the original module may have ceased or that the initial specifications have been modified.*
- *Onyx Solar Energy S.L is not responsible for, and the client hereby accepts to take charge of the costs of any local work and any cost associated to the installation, elimination, reinstallation or transportation of the module and/or any other associate component to those mentioned for the undertaken services in order to resolve the problem during the supplied WARRANTY period.*

The warranty offered herein will be applied only while the product is property of (i) the initial purchaser that acquired the product for his own use and not in order to resell or (ii) due to the acquisition of the building where the product was installed.

The validity of the present warranty will not be extended longer than the original period specified and described in section A) and B) of the present certificate.

2. TÉRMINOS GENERALES.

Las siguientes condiciones serán aplicables a los vidrios/módulos de vidrio fotovoltaicos proveídos por Onyx Solar Energy S.L para este proyecto y garantizados de acuerdo a la sección anterior:

- *Onyx Solar Energy S.L puede, de acuerdo a su propio criterio, utilizar piezas o productos nuevos o reformados tras la reparación o sustitución del módulo bajo esta GARANTÍA.*
- *Onyx Solar Energy S.L se reserva el derecho a proveer con un módulo diferente, para atender las reclamaciones en el caso de que haya cesado la fabricación del módulo original o las especificaciones iniciales hayan sido modificadas.*
- *Onyx Solar Energy S.L no es responsable de, y el cliente acepta hacerse cargo de los costes de cualquier mano de obra local o cualquier coste asociado a la instalación, eliminación, reinstalación o transporte del módulo y/o cualquier otro componente asociado a los mencionados para los servicios prestados para resolver el problema durante la duración de la garantía proporcionada.*

La garantía aquí ofrecida será aplicable solo si el producto es propiedad del (i) comprador inicial que adquirió este producto para su uso personal y no para revenderlo (ii) debido a la compra del edificio donde el producto fue instalado.

La validez de la presente garantía no se extenderá más allá del periodo original especificado y descrito en las secciones A) y B) del presente certificado.

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3. EXCLUSIONS AND LIMITATION OF WARRANTY

The warranties herein offered do not cover damage, failure or defects caused by:

- *Not following the installation, functioning or maintenance instructions offered by Onyx Solar Energy S.L*
- *Reparations, modifications or manipulation of the modules object of the present WARRANTY done by any other person that is not a technician authorized by Onyx Solar Energy S.L, or if the PV glass/glass modules are connected to non recommended equipment.*
- *Misuse or negligent acts.*
  - *Damage caused by over tension, atmospheric discharge, fire, floods, plague, accidental breakage, actions by third parties and other events or accidents beyond reasonable control by Onyx Solar Energy S.L and those that do not occur under normal operating conditions.*
  - *Breakage of the laminates if the modules are installed on systems designed by the client.*

PV modules with manipulated series number or non recognizable identification shall not be subject to the WARRANTY.

Onyx Solar Energy S.L does NOT give any WARRANTY, explicit or implicit, different to the warranties herein expressed and is not specifically responsible for adaptation to any certain purpose.

3. EXCLUSIONES Y LIMITACIONES DE LA GARANTÍA

Las garantías aquí ofrecidas no cubren el daño, fallo o defecto causado por:

- *No seguir las instrucciones de instalación, funcionamiento o mantenimiento ofrecidas por Onyx Solar Energy S.L*
- *Reparaciones, modificaciones o manipulaciones de los módulos objeto de la presente GARANTÍA realizadas por cualquier persona que no sea un técnico autorizado por Onyx Solar Energy S.L, o si módulos de vidrio fotovoltaicos han sido conectados a equipos no recomendados.*
- *Mal uso o negligencia.*
- *Daño causado por subidas de tensión, descarga atmosférica, fuego, inundaciones, plagas, daños accidentales, acción de terceras partes o cualquier otro suceso o accidente fuera del control razonable de Onyx Solar Energy S.L y aquellos que no ocurren bajo condiciones operativas normales.*
- *Daños de los laminados si los módulos están instalados en sistemas diseñados por el cliente.*

Aquellos módulos fotovoltaicos con números de serie manipulados o sin identificación reconocible no estarán sujetos a esta GARANTÍA.

Onyx Solar Energy S.L NO concede ninguna GARANTÍA, explícita o implícitamente, diferente a las garantías aquí expresadas y no es específicamente responsable de la adaptación por ningún propósito cierto.

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Onyx Solar Energy S.L is not responsible for any special, accidental, consequential or punitive damage that may result from the use or lack of use or failure of the module to perform the guaranteed function, including but not limited to damages for requested services, costs of substitution services, lost benefits or savings, and expenses resulting from lawsuit against third parties. The maximum responsibility of Onyx Solar Energy S.L under any WARRANTY, explicit or implicit or established by law or due to any manufacturing or design defect, is limited to the purchase price of the product. The buyer's exclusive remedy for non compliance of the WARRANTY or for manufacturing or design defect is only the one herein exposed.

If at any time any controversy shall arise between BUYER and Onyx Solar Energy S.L regarding the warranties provided in this certificate, the parties hereto agree to attend mediation. In the event mediation is unsuccessful, both parties agree to binding arbitration, where the award is enforceable in a court of competent jurisdiction.

4. CLAIM FOR THE SERVICE UNDER WARRANTY AND/OR INFORMATION ABOUT THE OPTIONS FOR DISPOSITION AND RECYCLING.

To obtain technical service under WARRANTY or options for disposition and/or recycling, please contact Onyx Solar Energy. The contact numbers can be found at http://www.onyxsolar.com

In the case of a claim according to this WARRANTY the post-sale department will activate the internal general procedure for claims and once analyzed the client will be informed of the corrective actions to be taken.

Onyx Solar Energy S.L no es responsable de ningún daño especial, accidental, consiguiente o por daños o perjuicios que pueda resultar del uso o falta de uso o error del módulo para realizar su función garantizada, incluido pero no limitado a daños por servicios solicitados, costes de servicios de sustitución, beneficios o ahorros perdidos, y gastos derivados de procesos legales contra terceras partes. La máxima responsabilidad de Onyx Solar Energy S.L bajo cualquier GARANTÍA explícita o implícita o establecida por ley o debida a cualquier defecto de fabricación o diseño, está limitada al precio de compra del producto. La compensación exclusiva para el comprador por el no cumplimiento de esta GARANTÍA o por defecto de fabricación o diseño la aquí expuesta.

Si en cualquier momento surge cualquier controversia entre el COMPRADOR y Onyx Solar Energy S.L relacionada con las garantías provistas en este certificado, las partes acuerdan usar un mediador. En caso de que la mediación no sea efectiva, ambas partes están de acuerdo en someterse a arbitraje, en el cual la compensación es ejecutable en una corte de jurisdicción competente.

4. RECLAMACIÓN DE SERVICIOS BAJO GARANTÍA Y/O INFORMACIÓN SOBRE LAS OPCIONES DE DESECHO Y RECICLAJE.

Para obtener servicio técnico bajo GARANTÍA u opciones para el desecho o reciclaje, por favor contacte con Onyx Solar Energy. Nuestros teléfonos de contacto pueden encontrase en http://www.onyxsolar.com

En el caso de una reclamación acorde a esta GARANTÍA, el departamento de postventa activará los procedimientos generales internos para reclamaciones y una vez analizada, el cliente será informado de las acciones correctivas que se tomarán.

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5. COMING INTO FORCE OF THE PRESENT DOCUMENT.

The present certificate, that modifies any previous existing document, will come into force on the XXXXXXXX, XXth, 2014 and will be of application for the specific project described in this submittal.

6. COMING INTO FORCE OF THE WARRANTY.

The effect of the present WARRANTY will commence on the day of the initial purchase by the client, whose name appears in the present WARRANTY certificate.

CLIENT	
PURCHASE DATE	
DELIVERY NOTE	

OFFICIAL STAMP OF THE COMPANY

5. ENTRADA EN VIGOR DEL PRESENTE DOCUMENTO.

El presente certificado, que modifica cualquier documento existente anteriormente, tendrá como fecha de entrada en vigor el XX, XXXXXXXX, 2014 y será de aplicación para el proyecto específico descrito en este manual.

6. FECHA EFECTIVA DE LA GARANTÍA.

Los efectos de la presente GARANTÍA comenzarán el día de la compra inicial efectuada por el cliente, cuyo nombre aparece en este certificado de GARANTÍA.

CLIENTE	
FECHA DE COMPRA	
ALBARÁN	

SELLO OFICIAL DE LA EMPRESA

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